

Chemistry 100

Study Guide for Exam 4 (Wednesday, December 3rd)

The main topics to study for the exam, along with some previous exam questions are provided below.

Chapter 8 (section 8.7)

- Chapman cycle ozone formation/destruction
- CFC's role in ozone depletion
- why ozone layer is important to life
- ozone hole formation
- greenhouse effect
- global warming
- CO₂ trends

Sample questions:

1. Identify two properties of CFCs that make them especially suitable for use as refrigerants.
2. Describe how one Cl atom can be responsible for destroying 100,000 ozone molecules.
3. What conditions are required for the formation of an "ozone hole" over Antarctica.
4. Ozone is a naturally occurring species in our atmosphere with some beneficial properties. It is also a pollutant with many harmful properties. Explain why these two sentences are not contradictory.
5. What conditions are required for the formation of the ozone hole over Antarctica?
6. What is the enhanced greenhouse effect?
7. Describe CO₂ concentration trends in the atmosphere over the last 150 years.
8. In addition to carbon dioxide, several other compounds are important greenhouse gasses. For the greenhouse gases below, indicate one important source of this compound in our atmosphere.
 - (a) methane, CH₄
 - (b) nitrous oxide, N₂O
 - (c) CFC's, such as CCl₂F₂

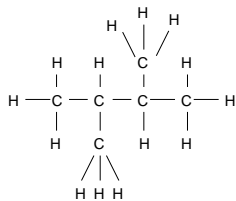
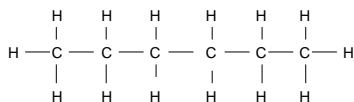
Chapter 9: Sections 9.2, 9.3

- fossil fuels
- petroleum refining
- octane ratings

Sample questions:

1. What is the primary component of natural gas? What advantages does natural gas have over other fossil fuels?
2. Which fossil fuel (coal, petroleum or natural gas) is the most abundant on Earth?
3. How does the energy content of the fossil fuels (coal, petroleum and natural gas) compare to one another? To wood?
4. How does the energy content of ethanol compare to the energy content of petroleum? What advantages does ethanol have over petroleum?
5. What physical property of hydrocarbons is used in fractional distillation in the petroleum refining process?

- Describe the process of petroleum refining including at least two products that are produced (other than gasoline).
- What is cracking and what is it used for?
- Which one of the following molecules is likely to have a higher octane number and why?

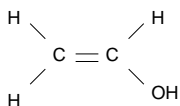


Chapter 10

- Addition polymers and condensation polymers
- Be able to draw a picture of an addition polymer given the corresponding monomer
- Be able to draw a picture of a condensation polymer given the corresponding monomers
- Definitions of monomer and polymer
- Differences between LDPE and HDPE (properties/structures).
- plasticizers, thermoplastic polymers, thermosetting polymers
- Functional groups: ethers, alcohols, carboxylic acids, ketones, esters
- Identify a few of the issues associated with the use and disposal of plastics

Sample questions:

- Describe three of the six ways to modify the properties of a polymer which were discussed in class.
- Classify the following properties and structural features as referring to HDPE or LDPE by placing HDPE or LDPE after each. (a) higher density (b) more branching (for example - other properties/features possible)
- Polyvinyl alcohol is an addition polymer made from the monomer below:



Draw a segment of the polyvinyl alcohol polymer containing at least 3 monomer units.

- Describe the difference between an addition and condensation polymer.
- Name the functional group present in each of the following molecules.

